Chemistry and Materials Science Directorate News

Providing scientific excellence and leadership that meet and anticipate the needs of the Laboratory's programs

Spring 2005
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Inside This Issue

Message from the Associate Director

Please be safe; I care about your well-being. As you know, the Laboratory is committed to simultaneous excellence in science and operations. Working safely to ensure our own safety and that of those around us takes a strong and unwavering commitment from all of us. Working together in teams of scientists, engineers, ES&H, security, and business experts is part of the fabric of the Laboratory. But it's not enough to think that to be safe is to follow prescribed procedures. Too often, we tend to think of safety as a special effort we make when engaging in selected activities that have been identified as dangerous. Safety needs to be built into the way we approach work—as a process, and not just a procedure. Your expert knowledge must be an integral part of how you ensure safety in the workplace, but ensuring flawless implementation of our Integrated Safety Management principles is also essential.

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chemistry & materials science CMS

Corner on Science

Assessing Radiological Contamination

Dealing with the aftereffects of a nuclear explosion, power plant accident, or dirty bomb is getting easier, thanks to two LLNL efforts. CMS personnel are giving first responders and specialized cleanup teams new, easy-to-implement techniques that allow areas affected by radiological releases to be characterized while protecting assessment workers.

One effort, led by **Chuck Stevens** and funded by the Defense Advanced Research Projects Agency (DARPA) Radiation Decontamination Program, grew out of a Nonproliferation, Arms Control, and International Security (NAI) Directorate–funded Laboratory Directed Research and Development (LDRD) project, "Photochromic Radiation Dosimetry." Photochromism is a light-induced change of color, the most well-known use of this phenomenon being the automatic darkening of eyeglasses in the "photo gray" effect. **Nerine Cherepy, Bob Sanner, Larry Hrubesh,** and **Tom Tillotson,** all of CMS, are developing a fieldable stand-off sensor or dosimeter combining photochromism with a small spherical gradient-index retroreflector, also known as a Maxwell fisheye lens. Such an arrangement allows light rays from any direction to focus onto a retina close to the lens, like a fish's eye. Though the principle was understood in the late 1800s, no one knew how to make such an optical element until now. Expertise in sol-gel technology allowed Hrubesh and Tillotson to develop a new method for creating these lenses, using selective dissolution and diffusion in gel spheres. This lens boosts focusing power, resulting in efficient retroreflection of a laser interrogation signal and allowing assessment workers to read the dosimeters quickly and safely.

The photochromic dosimeters may be distributed over an area as wide as several square miles. As the sensors accumulate a radiation dose over the first 24 hours after an incident, they can be read out a number of times to map the radiation field. Stevens says, "The radiation dose is stored in the photochromic layer [of the sensor] and read out by a laser, similar to a bit being read out by a laser

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Interview with... Paul Hoeprich, Jr.

We welcome **Paul Hoeprich, Jr.** to his new position. He serves as a bridge between Chemistry and Materials Science (CMS) and the recently renamed Biosciences (BIO) Directorate. Matrixed from CMS as the leader of the new Biotechnology Division in BIO, Paul has become a coordinator of interdirectorate research and technology development. About the time when the Biology and Biotechnology Research Program was renamed to BIO, Paul arrived at the Laboratory with more than 20 years of experience as a practicing scientist, inventor and developer of new technology, and entrepreneur.

Paul has had a high-energy career. As entrepreneur, he conceived and developed an idea that led to starting Argonaut Technologies in 1994; in 2001, he founded the Gentura Consulting Group. He has managed research and development operations at Triton Biosciences, Applied Biosystems, Hewlett Packard/Agilent, and Genicon Sciences.

As his career evolved, Paul discovered a passion for developing technology in ways that enable

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A PDF of this newsletter with clickable Web links can be downloaded from the CMS Web site: www-cms.llnl.gov/news/newsletter.html.

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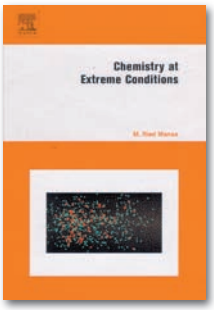
National Nuclear Security Administration

Notable Publications BY MICHAEL FLUSS

Chemistry at Extreme Conditions

Certain areas of research are unarguably the core of LLNL's science and technology. One of those is chemistry at extreme conditions. While most physical chemists are exposed to chemistry at high pressures and temperatures, and some even study the shock physics of materials, the real training, the hothouse, if you will, of activity is at facilities such as LLNL. While this is an enviable position for the Lab, it is also a serious responsibility for our scientists to not only generate new knowledge but to disseminate it. **Riad Manaa** has done just that! He has edited a collection of articles (one of which he co-authors) that provide practical reports on up-to-date research in high-pressure chemistry. Many of the articles' authors are LLNL and CMS scientists. Thanks to Riad, the excellent science that we do and the cultivation of our critical research areas is assured. The book is published by Elsevier Press; it covers those chemical processes that occur in the pressure regime of 0.5–200 GPa and temperature range of 500–5000 K; and it includes such varied phenomena as comet collisions, synthesis of super-hard materials, detonation and combustion of energetic materials, and organic conversions in the interior of planets. Visit the Elsevier web site for details.



Out-of-This-World Materials Science

You think Livermore water is hard. Wait until you try to do your wash on Neptune; the water there is as hard as steel. CMS scientists **Alexander Goncharov, Nir Goldman, Laurence Fried, Jonathan Crowhurst, I-Feng Kuo, Christopher Mundy,** and **Joseph Zaug** discovered an important new phase of water. They succeeded in recreating the conditions inside the giant planets by using sophisticated diamond anvil cells to show that the water inside giants such as Neptune may be described by a rigid lattice of oxygen with highly mobile hydrogen atoms—a type of H_2O salt. The key to this work was monitoring the O-H stretching frequency as a function of pressure and temperature to map out the phase boundary of the new form of water. This superionic phase was confirmed by large-scale computational modeling. The work, "Dynamic Ionization of Water under Extreme Conditions," is in press (*Physical Review Letters* **94**, 125508) and has attracted the attention of *Nature* and appeared in their news notes. Alexander Goncharov notes that in addition to the broad astrophysical, geophysical, and physical science implications of the work, it might be reasonable to speculate that there just may be more superionic water than normal water in the icy large planets. Finally, competition for East Bay MUD! ■

Message from the Associate Director

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CMS has always emphasized safe work practices, and we need to continue to improve. Personal commitment and integrity is the foundation of safety and security. You are responsible for your safety and that of the people around you.

We have started a campaign to emphasize some of the things that all of us as individuals can do to ensure a safe workplace. The posters appearing in the lobbies of our main buildings are aimed at reminding you that anyone can stop work in progress if it seems it is not safe to proceed, and it is of course important to always stop the activity in a safe way. Good housekeeping in the laboratories and offices is a fundamental principle from which safe operations derive. These posters and a safety checklist being distributed to all CMS personnel are ways of reminding everyone to think safety—it's a personal commitment and an attitude of concern for yourself and those around you, not just another procedure. Remember, all accidents are preventable. ■

Corner on Science

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in a CD player. Only, we do it from 100 meters." Sanner and Cherepy synthesized and characterized more than a dozen different photochromic materials (two are shown in Figure 1) before identifying the ideal candidate currently being used for the sensors. Similar photochromic materials have been extensively studied for optical data storage.

Even simpler technologies could help in assessing a dispersal of high-activity debris. In the aftermath of the Chernobyl accident, cleanup workers had difficulty finding and collecting radioactive solids such as nuclear fuel rods. At Chernobyl, cleanup efforts had to be abandoned—immobilization of highly active materials under steel and concrete was the only feasible solution—leaving a large area uninhabitable for many years. If a technology had been available to remotely locate and image highly radioactive chunks of material, it may have been possible to retrieve and contain them quickly.

Figure 1. (Left) A photochromic material in which a permanent dose may be stored in the form of green molecules. (Right) A reversible photochromic material that may store a dose as the purple form but can be converted back to the yellow "unwritten" form upon laser readout.

One such simple approach, currently being explored in a new NAI-funded LDRD project led by Cherepy, is to image passive optical signals from dispersed unshielded radioactive materials more than 20 meters away. The imager is a specialized charge-coupled device (CCD) camera with optics capable of discriminating a signal from radioactive material, even within a sunlit background. An example of the glow emanating from the surface of an alpha particle source is shown in Figure 2.

Also for this project, Cherepy and Sanner are developing encapsulating coatings that can be sprayed on radioactive surfaces to enhance their optical signals, allowing detection at much lower activity levels. Cherepy says, "The combination of materials research and optical design allows us to develop sensitive detection systems to determine exactly where radioactive materials are for cleanup applications, without complete reliance on extensive surveying with Geiger counters or collecting swipes and sending them for analysis. Such technologies will make cleanup activities safer for workers, more effective, and faster." ■

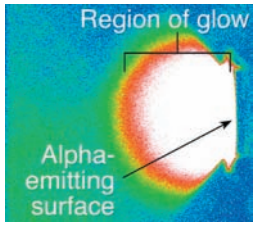


Figure 2. Side-on view of an alpha-contaminated surface showing a bright optical signal emanating from the surface.

Interview with...

Continued from page 1

and enhance scientific research and discovery. His role at the Laboratory enables him to continue following this passion. As division leader, he's now responsible for the growth and development of the Biomolecular NMR Group and the Livermore Microarray Center (LMAC), both lab-wide services.

The biomolecular nuclear magnetic resonance (NMR) center provides four NMR spectrometers for viewing proteins and nucleic acids as three-dimensional structures in interaction with other molecules. Paul stated that **Bob Maxwell** and **Julie Herberg** in the Chemical Biology and Nuclear Science Division are engaged in a joint effort with Monique Cosman in the Biomolecular NMR Group to develop capillary-based NMR microflow probe technology.

The LMAC is a centralized Laboratory facility that provides state-of-the-art microarray equipment for analyzing DNA, proteins, and peptides. Paul was a co-inventor of the underlying technology of one of the LMAC capabilities: the Affymetrix company's GeneChip microarray system and their spotting/array preparation technology. Now he is working with the LMAC to extend its services beyond arrays. **Julie Perkins,** for example, is using a Biacore surface plasmon resonance system for quantifying protein–small-molecule interaction.

As a facilitator of the CMS and BIO directorates' biological research efforts, Paul is excited about an impending proposal submission for Laboratory Directed Research and Development (LDRD) Strategic Initiative (SI) support, seeking to develop general methods for cell-free production of membrane proteins. The intent of the proposal is to place LLNL and collaborators, such as Sandia National Laboratories and Pacific Northwest National Laboratory, in a position to obtain DOE Office of Science funds for one of four $200-million facilities in the Genomics:GTL Program (formerly known as Genomes to Life).

The plan is for "Facility 1" in the Livermore Valley to be formally called the Facility for the Production and Characterization of Proteins and Molecular Tags or, less formally, the GTL Protein Production Facility. Among hundreds of studies in which the laboratory partners might engage, LLNL and Sandia plan to investigate how microbial proteins function and how they and molecular "tags" can be used to accelerate discoveries for obtaining energy from hydrogen and for environmental cleanup. Additionally, the work of CMS scientists including **Jane Bearinger, Amy Hiddessen,** and **Timothy Ratto** might contribute to the overall goals of the SI proposal. Collectively, their work addresses ex vivo conditions that could support functioning membrane proteins. Once DOE has provided the funding, Paul will use his startup experience to help the facility get under way.

When he's not working at the Laboratory, Paul enjoys his three children, biking, and offshore sailboat racing. When at the Laboratory, Paul obviously enjoys his penchant for bringing resources together to develop new projects, many of them involving resources from the CMS directorate. He quipped, "What's a nine-letter word for biotechnology? Chemistry. Applying chemistry to biology is what it's all about." ■

Directorate News

Building 242—Providing More Quality Offices

A new building is joining the CMS complex. The offices of Building 242 (B242) will replace 62 old trailer offices and provide 34 additional spaces, for a total of 96 bright, new work areas. Not to be mourned, two nearby trailers, occupied since the 1960s, will be returned to the Lab for demolition, and a leased trailer will be returned to the vendor. Strategically located, B242 will provide extra office space for the growing programs located in B235 and B241. Facility Point of Contact **John Kilmer** stated that the moves into B242 began in April and should be complete by early June.

B242 is one of three office structures built by a contractor who won a bid to design *and* build (called a design-build concept) the same two-storey design in several areas of the Laboratory. The companion buildings are B142, the first Replacement Office Building completed in FY04, and B264, which is planned for completion in FY05. Building 242 cost under $5 million, using Facility and Infrastructure Recapitalization Program (FIRP) funds. It features motion-sensor light switches; large windows; an elevator; and bathrooms, kitchen, and a conference room on each floor. The offices are decorated with patterned carpeting, and the walls are painted in light colors.

Parking is located in Lot C-4 and Lot C-5W; roughly 20 spaces are also located immediately adjacent to the building. The area behind the security barrier on the east side of the building will eventually be transformed as part of the Lab's master plan for landscaping to improve the quality of our surroundings. B242 fits into that plan very nicely.

Recent Management Changes

The CMS directorate organization and the Chemical Biology and Nuclear Science (CBN) Division have seen lots of new management assignments during the past few months.

CMS Directorate Organization

Al Moser, with responsibility for CMS facilities, business systems, resource management, and technical information, has the new title of Chief Financial Officer and Facility Director.

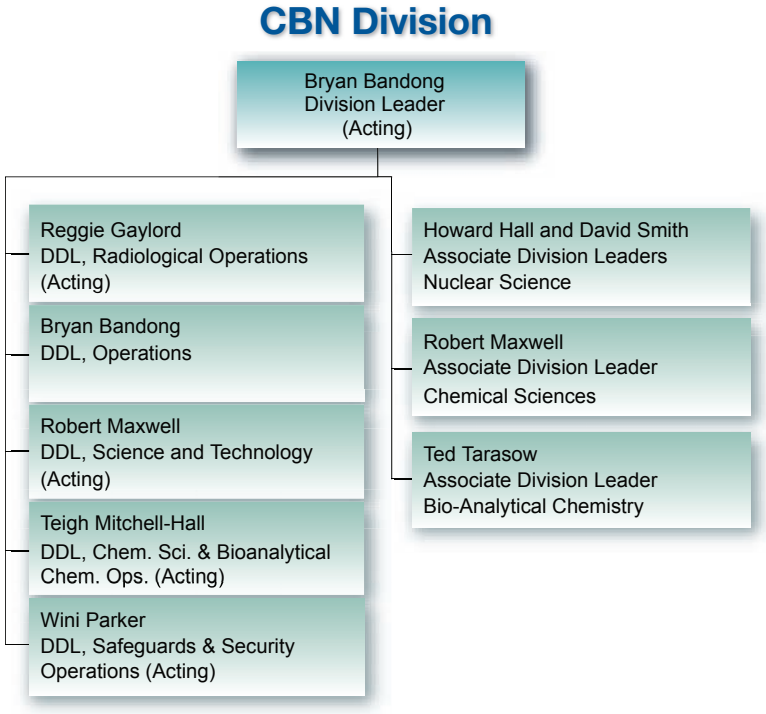
Greg Cooper, as Associate Directorate Facility Manager, will manage all CMS Site 200 facilities.

Lori Souza has been appointed Deputy Associate Director for Operations to oversee the development of a culture of scientific and operational excellence, including safety, security, and information technology operations.

Trina Voelker was selected as Directorate Administrator. She will direct and oversee all of the directorate's administrative personnel while providing administrative assistance to Associate Director Tomás Díaz de la Rubia.

Chemical Biology and Nuclear Science Division

Bryan Bandong continues as Deputy Division Leader (DDL), but most of his operations activities will be delegated while he serves as acting division leader. The organization chart displays other management assignments.



David Fergenson has assumed the responsibilities of Acting Program Element Leader (PEL) for Aerosol Sciences. Dr. Fergenson replaces **Eric Gard,** who has become the acting division leader for Defense Biology in the Biosciences Directorate.

Nancy Stoyer has agreed to serve as acting PEL of the Highly Enriched Uranium (HEU) Program while **Daniel Decman** is on assignment as the deputy program manager for the LLNL HEU support group working with the Department of Energy in Germantown, Maryland.

Chris Orme has been designated Scientific Capability Leader and Acting Director of the Physical Biosciences Group. She has also been assigned as a director of the Physical Biosciences Institute, which is set up to hire and mentor postdocs and graduate students in pursuing projects using LLNL capabilities in the physical and computational sciences. ■

Postdoc News

New CMS Postdoc Program Director Announced

Sarah Chinn has been appointed as director of the CMS Postdoctoral Program. Sarah received a B.A. in chemistry from Mount Holyoke College in S. Hadley, MA in 1997 and a Ph.D. in physical chemistry from UC Davis in 2002.

Sarah joined LLNL as a CMS postdoc in July 2002 and was converted to a staff position in July 2004. As a staff chemist in the Center for National Security Applications for Magnetic Resonance, she is working on a variety of research areas, including polymer aging and compatibility, characterization of advanced materials, carbon sequestration in geochemical environments, and the development and application of benchtop and portable NMR systems.

Notable Achievement

Molly Darragh has received a National Science Foundation graduate student fellowship. Molly worked for Chris Orme as a student intern until last August. She is now a UCSF graduate student.

Molly completed two projects: one involving the interaction of citrate with brushite ($CaHPO_4$) crystallization, of interest for kidney stone therapies; the second involving the interaction of calcium carbonate with peptides associated with polymorph selection in shell mineralization. Both of these projects are being published.

Welcome!

Welcome to **Thomas Han, Michael Singleton, Thomas La Grange,** and **John LaTour,** newly arrived from outside of the Lab. And welcome to **Todd Sulchek, Nan Shen,** and **Ted Laurence,** who transferred from the Biosciences Directorate. ■

Personnel News

CMS Publications Win International Awards

An international competition for excellence in technical publications, held annually by the Society for Technical Communication, announced awards that included two CMS publications. **Stephanie Shang, Charlie Westbrook, Michael Fluss,** Gabriele Rennie, and George Kitrinos were major CMS contributors to the 2003 *Chemistry and Materials Science Directorate Annual Report,* which received a Distinguished Award in the Annual Reports category.

The judges also presented an Excellence Award in the Informational Materials category to Stephanie, Emmeline Chen, and **Scott Dougherty** for their work on the *Chemistry and Materials Science Careers* recruiting brochure.

Chemical Biology and Nuclear Science Recognitions

Alexander Malkin was a member of the scientific committee and the plenary speaker at the Third Latin American Symposium on Scanning Probe Microscopy in Ouro Preto, Brazil.

Sarah Chinn, along with **Theodore Baumann**, **Joe Satcher**, and **Robert Maxwell**, received the Best Poster Award from the 2005 MRS (Materials Research Society) Spring Meeting in San Francisco.

The Defense and Nuclear Technologies (DNT) Directorate presented a certificate of appreciation to **Jackie Kenneally** in recognition of "outstanding contributions to the U19ad Drillback Project." DNT also awarded **Yves Dardenne, Dawn Shaughnessy, Nathan Wimer, Todd Wooddy, Carol Velsko, Ken Raschke, Allen Friensehner,** and Jackie Kenneally with certificates of appreciation in recognition of their "outstanding contributions in support of the U19ad Post Shot and Water Well Project."

The Environmental Protection Department presented the Spot Award to **Lennox Harris** to recognize the expertise he provided in gamma spectroscopy and analysis, radiological material handling, and general project management maintenance to bring B251 from a CAT-1 to a radiological facility status.

Two "Best in Class" Awards from DOE

Two LLNL projects have received the "Best in Class" award, given annually by the Department of Energy's Office of Science. **Reginald Gaylord** from CBND, **Patrick Gallagher** from CChED, and Jody Drake from the Lab's Radioactive and Hazardous Waste Management department, received the award for significantly reducing mixed waste to low-level waste at CMS's Chemical Environmental Services environmental analytical laboratory. **Karen Dodson** from MSTD was one of the recipients awarded for the Plutonium Facility tilt-pour furnace process. Congratulations!

Balazs Appointed to California ACS Board

Bryan Balazs was appointed for a four-year term on the Board of Trustees of the California Section of the American Chemical Society (ACS). The trustees manage the section's trust fund, which supports programs in education, public outreach, and career development.

Budil Is New Executive Committee Member

Congratulations to **Kim Budil** for her election as Member at Large on the American Physical Society's Topical Group on Shock Compression of Condensed Matter (GSCCM) Executive Committee. The GSCCM was founded in 1984 to promote the development and exchange of information on the dynamic high-pressure properties of materials. ■

Welcome to the Directorate…

Standing, from left to right: Tom LaGrange, Amitesh Maiti, Bob Haslett, Robert Erler, Amy Hiddessen, Paul Hoeprich, Nan Shen
Sitting, from left to right: Sung-Wook Chung, Yong Han, Martin Butterfield, Chris Jeans, Michael Singleton, Max Victoria
Not pictured: Greg Cooper, Todd Sulchek, Ted Laurence, and Magdalena Serrano de Caro

A Fond Farewell to…

Ronald Foreman, who transferred to the Mechanical Engineering Department; **Kim Hallock,** who transferred to the NIF Project; **Robin Martin,** who transferred to NAI's R Division; and **Adam Schwartz,** who transferred to PAT's H Division.

Postdoc Spotlight

Julie Smith: Experiencing the Antarctic

"Ice, snow, and sky as far as you can see, and a normal day was usually between minus 18 and 20 degrees Celsius [around –4 °F] during our 'summer' stay. My bare hands would get numb from the cold in only a minute when I had to remove my gloves." This is how postdoc **Julie Smith** describes her two-month work experience in the frigid expanses of Antarctica.

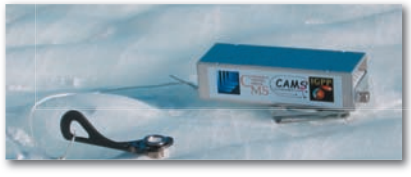
Julie, who holds a postdoctoral fellowship in the Chemical and Isotopic Signatures Group within the Chemical Biology and Nuclear Science Division, has been using part of her time here at the Laboratory analyzing interplanetary dust particles, which can be found within meteorites. Julie took a few moments during her search on the Antarctic ice to set and then retrieve meteorite dust traps she brought from the Laboratory.

The Antarctic Search for Meteorites (ANSMET) program—funded by the National Science Foundation and the National Aeronautics and Space Administration—paid for Julie and 11 other planetary materials researchers to make a systematic search during December and January for meteorites exposed by the wind near the South Pole. The ANSMET program has sent 28 expeditions to Antarctica since 1976 to retrieve meteorites to be used for scientific study all over the world. Why go to Antarctica to find meteorites, which fall to earth everywhere? They are relatively easy to find on a wind-swept, white, flat surface where one can be confident that the only rocks that *didn't* arrive from outer space lie 3000 meters below the ice. Julie's group of six women and six men were flown in a C-130 cargo plane from Christchurch, New Zealand, to McMurdo Station for training before beginning six weeks of camping on the LaPaz ice field.

At McMurdo, the group was taught how to recognize frostbite and how to camp and survive in extreme cold, how to avoid falling into crevasses in the ice and how to get back out if a fall were to occur, and the extreme importance of avoiding fires. A ski-equipped LC-130 flew them to the South Pole; from there, a much smaller Twin Otter plane made ten trips to their base camp because it could carry only two members, their gear, and one snowmobile at a time. Field gear included solar and wind generators, satellite phones, solar-recharged radios, and double-walled two-person Scott tents. It took three days to set up the base camp.

Julie at the geographic South Pole


Preparing to use a pair of tongs to bag a metiorite



Trap used to collect tiny meteoritic particles blown by the wind

During the relatively mild Antarctic summer with 24 hours of sunlight each day, the group's activities were dictated mainly by the need for food and sleep and by the changing weather. "We worked every day of the week unless the weather was bad," says Julie. A 35- to 45-knot (40–52 mph) wind would blow snow, preventing the search for meteorites and forcing the members to shelter in their tents. When searching in a new area, the group drove their snowmobiles single file behind an experienced leader, who was always alert for crevasses.

"We were completely covered most of the time when outdoors. Getting dressed took much longer than usual," remarked Julie with a grin. Her list of three or four layers of clothing included two pairs of long johns, polar fleece pants, windbreaker pants, bib coverall, two long-sleeve thermal tops, an expedition-weight top, windbreaker jacket, polar fleece jacket, windbreaker parka, down parka, balaclava, baseball cap, wool cap, windblocker cap, and two pairs of gloves.

Would she go again? In a minute. "Since childhood, I've wanted to go to Antarctica, a unique place and so vast that I have seen only a small part of it," she replies. "Collecting meteorites was great, and I would be happy to do that again, or anything else if the opportunity arises." ■

Please send items for the next newsletter (e.g., directorate news, awards, conference calendar items) to **Allan Francke** (francke1@llnl.gov).

Conference Calendar

DATE	CONFERENCE	LOCATION	WEB SITE
May 23–25	Second IUPAP International Conference on Women in Physics	Rio de Janeiro, Brazil	www.cbpf.br/~women-physics/
May 25–27	2005 Workshop on Nuclear Data for the Weapons Program	Los Alamos, NM	www.lanl.gov/conferences/nucleardata/
June 4	Sixth Vietnamese Association for Computing, Engineering Technology and Science (VACETS) Technical International Conference	Milpitas, CA	www.engr.sjsu.edu/cpham/VTIC05/
June 5–9	53rd American Society for Mass Spectrometry Conference	San Antonio, TX	www.asms.org/Default.aspx?tabid=43
June 14–16	2005 PolyMAC Symposium, Y-12 National Security Complex	Oak Ridge, TN	www1.y12.doe.gov/public/news/events/polymac/
July 25–29	Sixth International Conference on Chemical Kinetics	Gaithersburg, MD	www.nist.gov/kinetics2005/
July 31–Aug. 4	47th Rocky Mountain Conference on Analytical Chemistry	Denver, CO	www.milestoneshows.com/rmcac/
July 31–Aug. 5	14th American Physical Society Topical Conference on Shock Compression of Condensed Matter (SCCM-05)	Baltimore, MD	www.chemistry.usna.edu/elert/fp/whole_announce.htm
Aug. 28–Sep. 1	230th American Chemical Society National Meeting	Washington, DC	www.chemistry.org/portal/a/c/s/1/acsdisplay.html?DOC=meetings\future.html
Oct. 21–26	International Conference of Computational Methods Sciences and Engineering 2005 (ICCMSE 2005)	Korinthos, Greece	www.uop.gr/~iccmse/Sessions_Minisymposia.htm
Nov. 28–Dec. 2	MRS Symposium H: Multifunctional Energetic Materials	Boston, MA	www.mrs.org/meetings/fall2005

Second IUPAP International Conference on Women in Physics

The International Union of Pure and Applied Physics (IUPAP) has invited **Kimberly Budil** to attend this second conference organized to strengthen women in physics: their network, their research, and their future in physics.

VACETS Conference

Tri Tran of CMS is the general chair of the sixth VACETS conference, and **Tuyet Tran** is a member of the conference planning committee.

Sixth International Conference on Chemical Kinetics

William Pitz will present a plenary lecture entitled "Challenges in the Development of Detailed Chemical Kinetic Mechanisms for Practical Fuels."

SCCM-05

Larry Fried will present a plenary talk on "Extreme Chemistry," and **Christian Mailhiot** and **Paul Urtiew** are conference advisors.

ICCMSE 2005

Krishnan Balasubramanian will chair a small symposium called "Applications of Computational and Mathematical Chemistry: From Structure to Biology."

MRS Symposium H

Alexander Gash is an organizer of this Materials Research Society (MRS) symposium. The abstract deadline is June 21.

Plutonium Futures—The Science 2006

Mike Fluss is the chairperson, and many others from the directorate are organizing this conference with Los Alamos National Laboratory for next year at Asilomar, Pacific Grove, CA. Preregister now at www-cms.llnl.gov/pu2006/ to indicate your interest.

A PDF of this newsletter with clickable links can be downloaded from the CMS Web site at http://www-cms.llnl.gov/news/newsletter.html